Permitting, Zoning & Interconnection of Residential Solar PV in NH

Overview of New Hampshire Residential Rooftop Solar PV Permitting, Zoning and Interconnection Guide

Topics to be Covered

- Project Background
- NH Residential Rooftop Solar PV Permitting, Zoning and Interconnection Guide
  - Purpose and process
  - Review of Guide
  - Review of checklists and technical appendices
  - Insights from the field
- Questions and Observations from Participants

Project Background

Residential Rooftop Solar PV

- Rooftop Solar Challenge II – US DOE grant
  - Clean Energy States Alliance and regional partners
  - Reducing soft costs associated with residential rooftop solar PV installations
- NH focus:
  - Permitting process & Zoning requirements
  - Utility interconnection process

The Guide

Residential Rooftop Solar PV

- Purpose and Process of Guide development
  - Purpose – to provide information and tools for municipalities, installers and others, to help them reduce soft costs for residential solar PV.
  - What we did – stakeholder input, data collection, researched best practices, studied and adapted regionally-developed resources.

New Hampshire Residential Rooftop Solar PV Permitting, Zoning and Interconnection Guide
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CleanEnergy States Alliance
GDS Associates, Inc. Engineers and Consultants
New Hampshire OEP Office of Energy and Planning
Resilience

Examples of "Soft Cost"

Example of Project Soft Costs:

Here is an example of the soft costs incurred for one professional installation. These figures were provided by a New Hampshire solar PV installer and show how the permitting and inspection costs may play out in a New Hampshire community with value-based permitting – they are not meant to be representative of typical permitting costs for residential solar PV systems in the State.

Sample Permit Costs for a $20,000 residential rooftop array:

- $200 Building Permit ($10 per $1,000)
- $100 Electrical Permit ($5 per $1,000)
- $500 Structural Analysis and Professional Engineer's (PE) stamp
- $150 Installer Office labor (compiling and submitting permit materials)
- $300 Installer Labor costs (Licensed professional required to pick up permit in person, and return for final inspection)

$1,250 in associated permitting costs = 6.25% of project cost.

Key Elements Included in the Guide

1. Make information available for municipalities, residents, installers, and utilities
2. Simplify permit application, submission, review and inspection processes
3. Understand utility interconnection requirements
4. Pursue training and other resources

Available for download at http://www.nh.gov/oep/

Table of Contents

The Guide – Section I

Residential Rooftop Solar PV

- Determine potential for a solar PV project and meet with installer(s). *
- Contact administrative staff in your city or town to understand the permitting process.
- Complete the simplified interconnection application process with your utility and understand if any transformer upgrades are necessary.
- Submit Part 1 of the NH State Residential Solar Rebate application.
- Receive approval from your city or town for installation of solar PV system.
  Receive approval from your local utility for electrical interconnection.
- Install solar PV system. Complete PV system and electrical interconnection inspections.
- Complete and submit Part 2 of NH State Solar PV Rebate application.
  File for Federal tax credits (completed with Form 1040).

* As with any significant purchase, shop around when considering purchasing a solar PV system. Gather as much information as possible, check contractor references and obtain multiple quotes.

The Guide – Section II: State Policies

Laws, Regulations, Codes and Zoning

- Renewable Portfolio Standard (RPS)
- Net Metering
- Group Net Metering
- NH State Building Codes

The Guide – Section II: Permits & Fees

Laws, Regulations, Codes and Zoning

- No standard application or fee for obtaining a permit to install solar PV
- Each of New Hampshire's 234 municipalities have their own permitting process, application & fee structure including:
  - Solar specific permits with flat fees.
  - Solar PV check box on the building permit and a $25 permit fee.
  - Just requiring an electrical permit and/or building permit.
  - Minimum fee and then a fee calculation based on the construction cost.

The Guide – Section II: Zoning & Laws

Laws, Regulations, Codes and Zoning

- Zoning
  - Ground mounted arrays – setbacks
  - Rooftop arrays – historic district provisions
- Solar Access Laws
  - NH RSAs provide legal basis for protecting solar access – Including Chapter 53-F, 477:49-51, and 674:2III(n)
  - Important concept – comes into play at the time of subdivision, but can be incorporated into solar setbacks for new structures.
- Homeowners Associations

The Guide – Section III

Residential Rooftop Solar PV Strategies

- Make Permitting Information Available
  - Review and document the existing permitting process.
  - Provide resources on municipal websites.
- Resources include:
  - Sample Permit Checklist
  - Sample Permit Application
    - Sample Application Form
    - Sample Drawings –
      - Electrical, Site Plan and Solar PV Attachment Detail
  - Sample Structural Review Worksheet

Sample Permit Checklist

Residential Rooftop Solar PV

Purpose: Clearly communicate the <u>steps</u> required by a municipality for an applicant to receive authorization to install a residential solar PV system

Permit Checklist:

- Defines Permit Application Type & Fees
- Defines required supporting documentation, such as:
  - Drawings: One-Line Electrical Drawing & One-Line Site Plan and Attachment and/or Mounting Details
  - Solar PV Module Specification Sheets
  - Inverter Specification Sheets
  - Structural Review Worksheet
- Permit Submission Process including hours open & contact information
- Process for scheduling an inspection including contact information

[Insert Town/City Name]

> ***Note*** *- The purpose of a project permit checklist is to clearly communicate the steps that must be completed by an applicant to receive approval to install a residential solar PV system. The checklist should reflect the regulatory process in place in your community, points of contact, and associated costs. The sample checklist below is based on the sample permit available in this Guide (Appendix B). This sample checklist serves only as an example, and should be adjusted to the process in your community.*

The Town/City of *(Insert Name)* encourages the installation of renewable energy systems through a clear and predictable permitting process outlined in this checklist. The permit application form and associated materials can be found at www.InsertTownWebsite.gov. The required elements for permit applications for solar PV installations are detailed below.

Permit Process:

The point of contact for solar PV permits is *(Insert Name)*, and can be contacted at *(Insert Contact Information)*.

The applicant (owner or system installer on behalf of owner) must complete the following steps:

- ☐ Complete a (*insert type of permit)* permit application (available at www.InsertTownWebsite.gov).
- ☐ Assemble supporting documents including:
  - Electrical One-Line Diagram (see Appendix B-1 for example)
  - One-Line Site Plan (see Appendix B-2 for example)
  - Attachment and/or Mounting Details (see Appendix B-3 for example)
  - Solar PV Module Specification Sheet
  - Inverter Specification Sheet
  - Pole or Ground Mount Information
  - Structural Review Worksheet (see Appendix C for example)
- ☐ Associated Costs:

  Insert cost of permit, indicate when fee is due and accepted methods of payment
- ☐ Submit permit materials by:
  - Email to *(Insert email address)*
  - Mail to *(Insert mailing address)*
  - In person at *(Insert physical address) – provide hours*
- ☐ After receiving a permit, the applicant may proceed with installation of the solar PV system. All permits must be posted in a visible location as instructed.

Once the system installation is complete, please contact *(Insert Name or title, and phone number or prefer method of communication)* to schedule an inspection.

Sample Municipal Residential Solar PV Permit Checklist

Sample Permit Application

Residential Rooftop Solar PV

- Property and Property Owner information
- Additional Information
  - Contractor Information
  - Scope of Work
- Registered Design Professional
  - Contact information
  - Scope of Work
- Solar PV System information
  - Mounting , modules and inverter

Sample Permit Application (Continued)

Residential Rooftop Solar PV

- Electrical Description
  - Size (amps) and type (phase, voltage) of service
  - Amperage main breaker / will value change?
  - Interconnection (supply side or breaker-load side)
  - Electrical panel location
  - Will load-side interconnect intertie into subpanel
    - If yes, rated amperage of subpanel bus bar

Sample Permit Application (Continued)

Residential Rooftop Solar PV

- Attachments to Application
  - Additional Subcontractor Information
  - One-line Electrical and Site Plan Drawings
  - Roof-mounted Attachment Details (line drawing), or
  - Pole or Ground-mounted Information
  - Solar PV Module and Inverter Specification Sheets from Manufacturer
  - Structural Review Worksheet
- Owner's Certification

Disclaimer: This sample worksheet is for informational purposes only and may not be used to satisfy municipal permitting or review requirements unless customized and expressly adopted for such use by the permitting municipality. The State of New Hampshire and the authors of this worksheet assume no responsibility for the use or misuse of the information contained in this sample worksheet and expressly disclaim liability for any damage, injury, loss, or expense arising from the use or misuse of the information contained in this sample worksheet. Use of this sample worksheet does not exempt the user from their responsibility to ensure compliance with all applicable municipal, state and federal laws and regulations

Application Date: Click to Enter Date.

General Description of Solar Photovoltaic (PV) Array: Enter Text

System Size (kW DC): Enter Text

Property Owner: Enter Text

Street Address: Enter Text | Parcel ID #: Enter Text

Town: Enter Text | State: Enter Text | Zip: Enter Text

Phone: Enter Text | Cell: Enter Text

Email: Enter Text | Fax: Enter Text

Additional Information: Enter Text

Contractor: Enter Text

Street Address: Enter Text

Town: Enter Text | State: Enter Text | Zip: Enter Text

Contact Name: Enter Text | Title: Enter Text

Phone: Enter Text | Cell: Enter Text

Email: Enter Text | Fax: Enter Text

License Type: Enter Text | State: Enter Text

License Number: Enter Text | Exp. Date: Click to Enter Date.

Scope of Work: Enter Text

Subcontractor or Professional Engineer: Enter Text

Street Address: Enter Text

Town: Enter Text | State: Enter Text | Zip: Enter Text

Contact Name: Enter Text | Title: Enter Text

Phone: Enter Text | Cell: Enter Text

Email: Enter Text | Fax: Enter Text

License Type: Enter Text | State: Enter Text

License Number: Enter Text | Exp. Date: Click to Enter Date.

Scope of Work: Enter Text

Please list on a separate sheet, included as attachment I, all of the above subcontractor information for any additional subcontractors employed on the project.

Solar Photovoltaic (PV) System Information:

Racking Type (roof, pole, ground, other-specify): Enter Text

Racking Manufacturer and Model #: Enter Text

Panel Manufacturer and Model #: Enter Text

Inverter Manufacturer and Model #: Enter Text

(Continued)

Sample Residential Solar PV Permit Application Pg. 1

Towns Will Modify & Adopt Individually

Sample Structural Review Worksheet

Residential Rooftop Solar PV

Purpose: For use to help evaluate the capacity of a roof's structure to support loads associated with a proposed solar PV system

- User Qualifications – applicable projects and users
- Visibility Requirements – guidelines for viewing structural components
- Anchorage to Structure – only for projects anchored directly to rafters, or use engineer

Sample Structural Review Worksheet

Residential Rooftop Solar PV (Continued)

- Structural Information
  - Roof Description – framing type and sizes, materials
  - Roof Load Calculations
- Structural Evaluation
  - Maximum Rafter Span Table Qualifier
  - Rafter Span Verification
- Structural Review Worksheet Conclusion
  - Do/do not need roof structure evaluation by Registered Design Professional

Usage Guide for the Structural Review Worksheet

Disclaimer: *This sample worksheet is for informational purposes only and may not be used to satisfy municipal permitting or review requirements unless customized and expressly adopted for such use by the permitting municipality. The State of New Hampshire and the authors of this worksheet assume no responsibility for the use or misuse of the information contained in this sample worksheet and expressly disclaim liability for any damage, injury, loss, or expense arising from the use or misuse of the information contained in this sample worksheet. Use of this sample worksheet does not exempt the user from their responsibility to ensure compliance with all applicable municipal, state and federal laws and regulations.*

This Structural Review Worksheet can be used to evaluate the integrity of a roof's framing for a proposed solar PV system. To use this Worksheet in an official capacity, you will need permission from the municipal building department. It is not intended to serve as a permit application but could be used as part of a permit application at the jurisdiction's discretion.

The Worksheet identifies structural conditions in a home's roof framing that may raise concerns with the installation of solar PV, including increased dead load and wind uplift.

This worksheet only applies to installations that meet the following basic criteria, as well as the more detailed criteria below and elsewhere in the Worksheet:

- Installation on home with regular, stick-built framing.
- Installation on home with asphalt shingle or standing metal seam roof
- Solar PV panels are flush mounted (i.e., installed parallel to the roof)

User Qualifications for the Structural Review Worksheet

Users of this worksheet should have demonstrable knowledge of typical residential roof framing systems. A number of certification programs may be acceptable evidence of qualifications, if approved by the local jurisdiction, for example:

- Registered Design Professional (Professional Engineer or Architect)
- Licensed Home Inspector
- Engineer-in-Training (EIT)
- North American Board of Certified Energy Practitioners (NABCEP) PV Installation Professional certification
- Other approved certifications that require training in structural inspection of residential framing systems.

Visibility Requirements:

Worksheet users must be able to view the roof framing to evaluate its strength. Enough of the framing must be exposed to be able to determine at a minimum:

- Rafter size and spacing
- Ridge board versus ridge beam
- Configuration of rafter cross-ties (e.g. attic floor, collar ties), including size and spacing
- Existence of framing irregularities (e.g. skylights, dormers) in the vicinity of the proposed PV panels
- Type of roof sheathing (e.g. plywood, oriented strand board (OSB), straight board sheathing)

If the framing is concealed by finishes, such as in spaces with cathedral ceilings, a Registered Design Professional should investigate the framing and review the proposed installation. Openings may be required in the finishes to observe the framing and document the construction details listed above.

Anchorage to Structure

Use of this worksheet is contingent upon fastening the PV system directly to the rafters. If the installer wishes to attach to the sheathing between the rafters, a registered design professional should evaluate the proposed design and confirm the available sheathing capacity. If the sheathing alone is not adequate to resist downward gravity and wind uplift forces, the addition of blocking between the rafters at the attachment locations may be a possible

Sample DRAFT Residential Solar PV Structural Review Worksheet Pg. 1

Electric Utility Interconnection

Key items to be aware of when navigating through the New Hampshire utility's electrical interconnection process include:

- *The process is simple, but important. Don't wait until mid-installation to start.*
- *Homes with multiple meters, or sub-meters cannot be combined under a single "net meter."*
- *Visible disconnect switch and labeling is required. These requirements are in addition to a recent (2014) National Energy Code requirement for a rapid disconnect switch that must be located on the rooftop within 6 feet of the PV system.*
- *Certificate of Completion must be signed by a town designee or electrician.*
- *Properly permitted, installed and inspected systems should not be "energized" until a "net meter" is installed by the interconnecting utility. Without a "net meter", all generation from the PV system that is fed back into the utility grid will be recorded as energy usage at the home, instead of as an offset to the homes actual energy usage.*
- *Under certain circumstances, the existing transformer serving a home's load where a PV system is installed may need to be upgraded to maintain grid system reliability. Such replacement is typically performed at the customer/homeowner's expense.*

Summary of Strategies

For Residential Rooftop Solar PV

- Make information available for municipalities, residents, installers, and utilities
- Simplify permit application, submission, review and inspection processes
- Understand utility interconnection requirements
- Pursue training and other resources

Resources

- Guide document posted on OEP website
  - Available for download at: http://www.nh.gov/oep/
  - Includes links to multiple other references and resources

Questions/Observations – All

- We would like to provide some time to address questions from the participants.
- Other comments or observations?

Thank You!

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